

WHAT IS CLAIMED IS:

1. An integrated circuit device having a circuit portion including a plurality of electronic elements, the device comprising:

5 a plurality of first element voltage supply lines connected to a higher potential terminal of the circuit portion;

10 a plurality of second element voltage supply lines connected to a lower potential terminal of the circuit portion;

a first trunk voltage supply line connected to each of the plurality of first element voltage supply lines;

a second trunk voltage supply line connected to each of the plurality of second element voltage supply lines;

15 a first branch voltage supply line connected to the first trunk voltage supply line to supply a voltage from the outside to the first trunk voltage supply line;

a second branch voltage supply line connected to the second trunk voltage supply line to supply a voltage from the outside to the second trunk voltage supply line;

20 a first wiring layer provided above the circuit portion to have the first and second element voltage supply lines and the first and second trunk voltage supply lines placed therein; and

25 at least one upper wiring layer provided above the

first wiring layer to have the first and second branch voltage supply lines placed therein.

2. The device of claim 1, wherein the at least one upper wiring layer includes a second wiring layer and a third wiring layer provided above the second wiring layer.

3. The device of claim 2, further comprising:

a first chip; and

a second chip serving as a substrate used only for wiring, wherein

the third wiring layer is provided in the second chip and

the voltage supply lines in the first wiring layer and the voltage supply lines in the third wiring layer are connected to each other by bonding the first and second chips to each other.

4. The device of claim 1, further comprising:

a first chip; and

a second chip serving as a substrate used only for wiring, wherein

the circuit portion and the first wiring layer are provided in the first chip,

the first branch voltage supply line is provided in the second chip, and

the first trunk voltage supply line and the first branch voltage supply line are connected to each other by

bonding the first and second chips to each other.

5. The device of claim 1, further comprising:

a first chip and a second chip serving as a substrate used only for wiring, wherein

5 the circuit portion and the first wiring layer are provided in the first chip,

the second branch voltage supply line is provided in the second chip, and

10 the second trunk voltage supply line and the second branch voltage supply line are connected to each other by bonding the first and second chips to each other.

6. The device of claim 1, further comprising:

15 first and second connecting terminals each provided at a connecting point between the first trunk voltage supply line and the first branch voltage supply line, wherein

the first and second connecting terminals are disposed in spaced apart relation with a given distance or more therebetween.

7. The device of claim 1, further comprising:

20 first and second connecting terminals each provided at a connecting point between the second trunk voltage supply line and the second branch voltage supply line, wherein

25 the first and second connecting terminals are disposed in spaced apart relation with a given distance or more therebetween.

8. An integrated circuit device having first and second circuit portions each including electronic elements, the device comprising:

a first voltage supply line;

5 a second voltage supply line connected to the first voltage supply line to supply a voltage to the first circuit portion;

10 a third voltage supply line connected to the first voltage supply line to supply a voltage to the second circuit portion;

a first connecting terminal for connecting the first and second voltage supply lines to each other; and

a second connecting terminal for connecting the first and third voltage supply lines to each other,

15 the device being configured to electrically isolate the second and third voltage supply lines from each other during testing of a connecting state at the first connecting terminal.

20 9. An integrated circuit device having first and second circuit portions each including electronic elements, the device comprising:

a first element voltage supply line connected to a higher-potential terminal of the first circuit portion;

25 a second element voltage supply line connected to a lower-potential terminal of the first circuit portion;

a third element voltage supply line connected to a higher-potential terminal of the second circuit portion;

a first trunk voltage supply line connected to each of the first and third element voltage supply lines;

5 a second trunk voltage supply line connected to the second element voltage supply line;

a first branch voltage supply line connected to the first trunk voltage supply line to supply a voltage from the outside to the first trunk voltage supply line;

10 a second branch voltage supply line connected to the second trunk voltage supply line to supply a voltage from the outside to the second trunk voltage supply line;

a first wiring layer having the first, second, and third element voltage supply lines and the first and second trunk voltage supply lines provided therein; and

15 at least one upper wiring layer located above the first wiring layer to have the first and second branch voltage supply lines provided therein.

10. The device of claim 9, wherein

20 the first trunk voltage supply line is composed of first and second wiring portions,

the first wiring portion is connected to the first element voltage supply line, and

25 the second wiring portion is connected to the third element voltage supply line,

the device being configured to electrically isolate the first and second wiring portions from each other during testing of a connecting state between the first wiring portion and the first branch voltage supply line.

5 11. An integrated circuit device having first and second circuit portions each including electronic elements, the device comprising:

 a first element voltage supply line connected to a lower-potential terminal of the first circuit portion;

10 a second element voltage supply line connected to a higher-potential terminal of the first circuit portion;

 a third element voltage supply line connected to a lower-potential terminal of the second circuit portion;

15 a first trunk voltage supply line connected to each of the first and third element voltage supply lines;

 a second trunk voltage supply line connected to the second element voltage supply line;

20 a first branch voltage supply line connected to the first trunk voltage supply line to supply a voltage from the outside to the first trunk voltage supply line;

 a second branch voltage supply line connected to the second trunk voltage supply line to supply a voltage from the outside to the second trunk voltage supply line;

25 a first wiring layer having the first, second, and third element voltage supply lines and the first and second

trunk voltage supply lines provided therein; and

at least one upper wiring layer located above the first wiring layer to have the first and second branch voltage supply lines provided therein.

5 12. The device of claim 11, wherein

the first trunk voltage supply line is composed of first and second wiring portions,

the first wiring portion is connected to the first element voltage supply line, and

10 the second wiring portion is connected to the third element voltage supply line,

the device being configured to electrically isolate the first and second wiring portions from each other during testing of a connecting state between the first wiring
15 portion and the first branch voltage supply line.

13. An integrated circuit device having first and second circuit portions each including electronic elements, the device comprising:

a first element voltage supply line connected to a
20 higher-potential terminal of the first circuit portion;

a second element voltage supply line connected to a lower-potential terminal of the first circuit portion;

a third element voltage supply line connected to a higher-potential terminal of the second circuit portion;

25 a fourth element voltage supply line connected to a

lower-potential terminal of the second circuit portion;

a first trunk voltage supply line connected to the first element voltage supply line;

5 a second trunk voltage supply line connected to each of the second and fourth element voltage supply lines;

a third trunk voltage supply line connected to the third element voltage supply line;

10 a first branch voltage supply line connected to each of the first and third trunk voltage supply lines to supply a voltage from the outside to each of the first and third trunk voltage supply lines;

15 a second branch voltage supply line connected to each of the second and fourth trunk voltage supply lines to supply a voltage from the outside to each of the second and fourth trunk voltage supply lines;

a first wiring layer having the first to fourth element voltage supply lines and the first to third trunk voltage supply lines provided therein; and

20 at least one upper wiring layer located above the first wiring layer to have the first and second branch voltage supply lines provided therein.

14. The device of claim 13, wherein

the first trunk voltage supply line is composed of first and second wiring portions,

25 the device being configured to electrically isolate the

first and third trunk voltage supply lines from each other during testing of a connecting state between the first trunk voltage supply line and the first branch voltage supply line.

15. The device of claim 13, wherein

5 the second trunk voltage supply line is composed of first and second wiring portions,

the device being configured to electrically isolate the second and fourth trunk voltage supply lines from each other during testing of a connecting state between the second trunk voltage supply line and the fourth branch voltage supply line.

10 16. A method for forming a wiring structure, the method comprising the steps of:

(a) determining an amount of voltage drop due to a resistance of a voltage supply line connected to a circuit portion of an integrated circuit device and a wiring structure equation representing a correlation between an area of the circuit portion and a current therein;

(b) determining, when the circuit portion is subdivided while a ratio between the area of the circuit portion and the current therein is maintained, a circuit characteristic equation representing a correlation between an area of each of subdivided circuit portions and a current therein; and

(c) determining a structure of the voltage supply line such that the area of the subdivided circuit portion and the current therein are equal to or less than an area and a

current given by solutions of simultaneous equations composed of the wiring structure equation and the circuit characteristic equation.

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